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ROYAL GARDENS, KEW.

BULLETIN

OF

MISCELLANEOUS INFORMATION.

No. 35.] NOVEMBER. [1889.

CXVIII.—PHYLLOXERA REGULATIONS AT THE CAPE.

The following letter, enclosing a copy of the new regulations affecting the introduction of plants and bulbs, lately published in the Government Gazette of Cape Colony, dated August 27th, 1889, has been addressed to this establishment by the Agent General. It will be noticed that the regulations, dated the 15th May 1884, absolutely prohibiting the introduction of any plants, tubers, roots, or bulbs into the Cape Colony, have now been so far modified as to admit of the introduction to Cape Town of plants other than grape vines under certain specified conditions.

Sir Charles Mills, K.C.M.G., to Royal Gardens, Kew.

Sir, 112, Victoria Street, London, S.W.

I enclose, for your information, a copy of a recently issued proclamation revoking, so far as it relates to the port of Cape Town, the regulations prohibiting the introduction into the Colony, from places

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1889.

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beyond the boundaries thereof, of grapes, vines, trees, plants, roots, bulbs, &c.

I have, &c.

The Director,
Royal Gardens, Kew.

(Signed) CHARLES MILLS.

REGULATIONS.

1. The importation into this Colony, from places beyond the boundaries thereof, of all grape vines or cuttings, or portions of grape vines, is absolutely prohibited.

2. The importation in the port of Cape Town of trees or plants (other than grape vines), and of tubers, roots, and bulbs, from any place beyond the boundaries of this Colony, will only be allowed under the following conditions:—

(*a.*) No such trees or plants, tubers, roots, or bulbs with earth adhering thereto, or in pots or cases containing earth, with the exception of grafts packed in clay and seed potatoes, shall be introduced into the port of Cape Town.

(*b.*) A declaration from the consignor made before a magistrate or other local authority having the power of administering oaths, stating (1) that the articles proposed to be imported were taken from a field, garden, greenhouse, hothouse, or other place containing no vine plant or any portion thereof, either growing or stored; (2) the distance of the nearest vineyard, and whether such vineyard has at any time suffered or is suffering from the Phylloxera vastatrix, must be produced by the consignee before such articles shall be allowed to be landed.

(*c.*) All packages, cases, pots, or coverings whatsoever containing trees, plants, tubers, roots, or bulbs shall be examined, before landing, by an officer to be appointed for that purpose, and it shall be the duty of the consignee to open all such packages, cases, pots, or coverings, for the purpose of the examination aforesaid, and to afford every facility to the examining officer during his examination.

(*d.*) On the examining officer being satisfied as to the absence of the Phylloxera vastatrix from the articles proposed to be imported, and as to the sufficiency of the declaration in section (*b*) above mentioned, he shall give a certificate to that effect to the consignee, and without such certificate no such articles shall be landed.

(*e.*) Should it appear to the examining officer that there are reasons for suspecting that such articles may harbour the Phylloxera vastatrix, he may, if he think fit, order the said articles to be disinfected in such manner as the Government may from time to time require.

(*f.*) All packages, cases, pots, or coverings containing articles which shall be found to be infected with the Phylloxera vastatrix, together with the articles therein, shall be immediately destroyed.

(*g.*) The Government does not hold itself liable for any loss or damage that may occur from the destruction of articles or the packages containing them, or from any process that may be considered necessary to discover the existence or otherwise of the Phylloxera vastatrix.

CXIX.—COLLECTING AND PRESERVING FLESHY FUNGI.

I.

Information is continually being sought by collectors abroad as to the best means of preserving fleshy fungi, so as to send them home in a condition suitable for determination. It is by no means an easy task to advise, in a general manner, on such a subject, but a few hints may be of assistance. The large woody *Polyporei* and the leathery species of *Stereum* only require to be dried (flattened where possible) to be available for the herbarium. With the soft and fleshy Agarics the case is different, as they shrink out of all recognition, change colour, and are liable not only to decay, but also to quick demolition by insects. No satisfactory determination of these can be made unless accompanied by sketches of the form, size, and colour as in life. It is not absolutely essential that they should be coloured, although that is best, but the colours must always be stated on the drawings. To assist those who are not facile with the pencil, it is recommended that the specimen collected should be divided longitudinally through the cap, and down the centre of the stem. When this is done one half should be laid on a sheet of white paper, with the cut surface downwards, and the outline traced carefully upon the paper with a sharp pointed pencil. On removing the specimen there will be left upon the paper an outline of the form of the Agaric, natural size. This may be completed by hand, drawing in the line, marking the margin of the cap, indications of scales on the pileus (if any exist) the character of the ring (if present) and the scales, lines, or markings of the stem. Another copy of the section made side by side, on the same paper, would give the outline of the gills, and by a little care and practice it will be found easy to draw the line from the stem to the edge of the cap, indicating the point of junction of the gills with the flesh of the cap. This should be done very carefully and accurately, as it must be depended upon to show whether the gills are quite free from the stem, at their inner extremity, or whether they are adnexed, or whether they are decurrent, and to what extent they run down the stem. Then also it should be shown if the stem is solid or hollow. A little colouring, even if not artistic, would be more useful than mere description of the general appearance of the Agaric. Then should follow copious notes, embracing all the points essential to a true diagnosis :—whether growing on wood, or on the ground ; whether viscid when fresh, or perfectly dry ; whether of an agreeable or fetid odour ; whether quite smooth, or mealy, silky or scaly ; whether acrid to the taste, or pungent or mild ; whether moderately persistent or deliquescent ; and, if the sketch is not coloured, then to state the colour of the cap, the stem, and the gills, as explicitly as possible. It need scarcely be added that the locality and date should be indicated together with a number which should also be attached to the specimens or their remains. These latter should be dried as thoroughly as possible, and sent with the sketches.

The only process of drying which can be recommended, as applicable abroad, is to expose the Agarics or Boleti, or other fleshy fungi, to a free current of air so as completely to deprive them of moisture. Care must be taken at this point that the specimens are not attacked by insects. When dried but not brittle a little pressure may be used so that the specimens may be flattened to assure greater convenience in packing. Carefully cut sections through the centre of the pileus and stem would

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be an advantage, but insufficient by themselves. These may be dried between moderately absorbent paper which requires changing every few hours.

Collections made in this manner have always been fairly successful, in proportion as the instructions have been carried out. It is useless attempting to send home specimens of this kind in spirits, or any kind of preserving fluid, as they entirely lose colour and in some cases are completely destroyed.

Leaf fungi only require to be dried *flat* in the same manner that the foliage of flowering plants is dried for the herbarium, under pressure. All indications of colour should be given wherever this is liable to be changed in drying, or by age.

Some collectors send over specimens of fungi, dried indiscriminately, without notes, or information of any kind. All these are probably mixed up together in a single parcel, and left to their fate. All that such collections are fit for is to be thrown away, and the labour of collecting and the cost of sending is wasted. If specimens of this kind are worth the trouble of collecting at all, they at least merit a little more care, and should come to hand in a condition that would ensure their recognition.

Fleshy fungi, when undergoing a long voyage are very liable to the incursions of insects, and especially of a marauding weevil. If sketches are made the specimens may be poisoned before packing, but in all instances they should be quite dry when packed, and carbolic acid should not be used. Corrosive sublimate usually answers the purpose very well, although some of the weevils seem to despise it.

All specimens should be mature, or mature specimens should accompany those which are young and undeveloped. In collecting great care should be exercised to secure the whole base of the stem (when present) since it is of great importance for accurate determination.

M. C. Cooke.

II.

The group of fungi known as the *Gasteromycetes* includes the puff-balls, earthstars, stinkhorns, &c., and judging from the mutilated specimens received from various parts of the world, contains numerous species of especial interest alike to the systematist and biologist. Mature specimens of all kinds should be allowed to remain exposed to the air until perfectly dry, which in many instances requires several days; when travelling, a convenient mode of drying is to pass a string through all the specimens of one kind along with the number label, and suspend them in a current of air. Most of the puffball family will bear this treatment, which is easy and successful; when dry, the specimens should *not be pressed at all*, but wrapped separately in paper and packed in boxes to prevent crushing. In cases where space cannot be afforded for unpressed specimens, the plants after being dried by exposure to the air may be subjected to a little pressure in packing between sheets of paper, the less the better, bearing in mind that soft, fleshy fungi of every description, which have been subjected to the amount of pressure during drying that is necessary for flowering plants, are in most instances absolutely valueless. Many species are covered with spines or warts that fall away during drying, hence it is necessary for the collector to make a note of such characters as are not likely to be observed in the dry state, such as the general character of the surface, whether scaly, spiny, warted, smooth, dry, or sticky; colour; and smell, if pronounced. The habitat is also of importance, whether growing on earth,

wood, amongst leaves, &c.; as also is the habit, whether solitary, gregarious, crowded, &c.

Collectors as a rule gather mature specimens only, but for the purpose of ascertaining the structure and affinities, *young specimens are* also *indispensable*, and should, if possible, be preserved in spirit; dry mature specimens should accompany the young plants preserved in spirit.

Chloral hydrate, in the proportion of an ounce to a quart of water, answers better for the preservation of fungi intended for microscopic investigation than spirit, unless absolute alcohol is used; it will also be found an excellent medium for the preservation of delicate liverworts, seaweeds, &c., as it causes no contraction or hardening of the tissues, and does not affect the colour.

G. Massee.

CXX.—OIL PALM IN LABUAN.—A SUCCESS AND A FAILURE.

(*Elæis guineensis.*)

One of the duties which is cheerfully undertaken by the Royal Gardens is to assist any Dependency of the Empire in introducing and establishing any new plant which promises to serve as the foundation of a new industry. Every attempt of the kind, as far as the Colonies are concerned, is generally undertaken on the initiative of the Colonial Office. While Kew assists in the technical details of the experiment and performs the duty of obtaining, receiving, cultivating, and transmitting the plants required to their new destination, it is only a matter of justice to say that the Colonial Office spares no pains to make the experiment a success, and aids in every possible way in bringing the experience and local knowledge of one part of the Empire to the aid of another. It would be difficult indeed to withhold co-operation from a body of men so anxious to carry out every suggestion which holds out the faintest possibility of leading to a useful result.

The following protracted correspondence (of which, however, only a portion has been selected for publication) is printed in order to afford an example of the amount of work which is involved in carrying out even a comparatively simple experiment. The enterprise is suggested; it is considered; a plan for carrying it out has to be matured; all the necessary incidental information has to be collected; and then the plan is carried into execution. Sometimes it fails the first time, and then a second attempt has to be made, and so on till success is secured. All that then remains is to wait for the result; and this, in any appreciable shape, will in most cases not be reached for years.

But in the interval Governors and officials change. It may be, though it is not always so, that the ardour with which the experiment was launched evaporates with the individual whom it inspired. A new Colonial Government *régime* may regard with apathy and even hostility the work of its predecessor, and the whole enterprise may fall into oblivion till some chance inquiry on the same subject leads to the digging out of the file of papers containing its record from the Kew archives.

The introduction of the Oil Palm from the Gold Coast into Labuan is such a story. The work was done, the trees grew and even fruited, and ten years later were grubbed up.

In the course of last month an application has been received from the Queensland Government for a supply of seeds of the Oil Palm for experimental cultivation in that Colony.

Colonial Office to Royal Gardens, Kew.

Sir, Downing Street, December 7, 1876.

I am directed by the Earl of Carnarvon to transmit to you a copy of a despatch received by the last mail from the Governor of Labuan, suggesting that it would be well to promote in Labuan the cultivation of the African Oil Palm.

Before taking any steps to carry into effect the wishes of the Governor his Lordship would be glad to receive your opinion as to the despatch of seed nuts or any other observations your experience may suggest on the matter.

I am, &c.

Dr. Hooker, (Signed) R. H. Meade.
Royal Gardens, Kew.

Governor Ussher to the Earl of Carnarvon.

Government House, Labuan,

My Lord, October 14, 1876.

In a conversation I have had with Mr. Treacher, the Acting Colonial Secretary, I endeavoured to explain to him the nature, uses, and cultivation of the *Elæis guineensis* or African Oil Palm.

2. It struck both him and myself that it might prove an industry well calculated for Labuan and the neighbouring islands, and that the rough unskilled labour required in boiling down the nuts for oil would be well adapted to a people, one of whose principal industries is the manufacture of cocoa-nut oil.

3. I venture therefore to suggest that your Lordship should cause to be shipped to the Colony, at its own expense, a few cwts. of the nuts for distribution and planting. Mr. Treacher himself would take the major part, as the island of Daat, belonging to his cousin, Dr. Treacher, is well adapted to palms, 20,000 fine cocoa-nut palms being already on the island, where a few years ago nothing but jungle was to be seen.

4. Any information as to the process used by the African natives for its conversion into oil, its cultivation, and the probability of its finding a market in Australia, would be highly desirable, and a portion of this information might, I think, easily be furnished by the Governor of the Gold Coast or the Administrator of Lagos, where the products of the oil palm are principal articles of export.

I have, &c.

The Right Hon. (Signed) H. J. Ussher,
The Earl of Carnarvon, Governor.
&c. &c. &c.

Messrs. James Irvine & Co. to Royal Gardens, Kew.

Commercial Buildings, Liverpool,
Dear Sir, December 27, 1876.

I have much pleasure in acknowledging receipt of yours of yesterday's date, asking for a bunch of the African Oil Palm kernels, which I think I can easily procure.

We have an intelligent correspondent from Monrovia in our office at the moment, and he suggests that the better plan would be to procure the bundle just as it is turning ripe, and send it home there and then, packed dry in an air-tight barrel.

I am, &c.
W. T. Thiselton Dyer, Esq., (Signed) James Irvine.
Royal Gardens, Kew.

Colonial Office to Royal Gardens, Kew.

Sir, Downing Street, January 3, 1877.

I am directed by the Earl of Carnarvon to convey to you his Lordship's thanks for your letter of the 26th of December, on the proposed cultivation of the African Oil Palm in Labuan.

The Governors of Sierra Leone and the Gold Coast have been requested, as suggested by you, to supply any useful information on the details of the industry which they may be able to collect. When replies have been received they shall be communicated to you.

I am, &c.
Dr. Hooker, C.B. (Signed) H. R. Meade.

Messrs. James Irvine & Co. to Royal Gardens, Kew.

Commercial Buildings, Liverpool,
Sir, January 25, 1877.

Following up my last, I now have pleasure in advising you that I have this day sent off a small parcel of Palm kernels, which was specially selected from a large quantity.

They are as fresh as it is possible to get them under the circumstances, and I hope they will germinate. I am told that they have repeatedly been planted, and have always failed to grow; however, with the extra advantages of Kew and Kew superintendents, perhaps they may grow with you.

The ones I have written for from the Coast will come in the shell and fresh from the trees, and I should quite expect that they will germinate; I expect them in about six weeks.

Yours, &c.
W. T. Thiselton Dyer, Esq., (Signed) James Irvine.
Royal Gardens, Kew.

Colonial Office to Royal Gardens, Kew.

Sir, Downing Street, June 8, 1877.

I am directed by the Secretary of State for the Colonies to acknowledge the receipt of your letter of the 22nd of March, in reference to the cultivation of the African Oil Palm, and to transmit to you a copy of a despatch from the Governor of the Gold Coast on the subject.

I am, &c.

(Signed) Robert G. W. Herbert.

J. D. Hooker, Esq., M.D.

Governor Freeling to the Earl of Carnarvon.

Government House, Christiansborg Castle,

My Lord, Accra, April 18, 1877.

In reply to your Lordship's despatch, Gold Coast, No. 368, of the 2nd January last, requesting to be furnished with any useful details connected with the Palm Oil industry on the West Coast of Africa, from a report thereon which I have received, in which the subject is divided into two heads, Cultivation and Produce, I beg to quote as follows:—

Cultivation.—The ripe nut is selected for this purpose; the ground is first well raked, and the nuts scattered broadcast over it, and lightly covered with earth, or a number of nuts, ranging from six to ten, is deposited in one spot at various distances, and covered with earth. The planting must be during the rainy season, as it requires a good quantity of water. When the young shoots have grown to about a foot in height they are carefully removed in the evening, and transplanted a distance of at least 15 feet from one another, and if planted during one season, it is better to allow them to remain until the next before they are transplanted.

The African Oil Palm grows luxuriantly and bears more abundantly at the height of from 10 to 12 feet in a damp semi-marshy soil and where water does not, however, stand. In arid dry soil it becomes stumpy and grows very slowly, and sometimes bears at 4 feet, but to cultivate the plant so as to ensure a proper growth, a development of a good number of nut branches, large in size, with nuts well supplied with flesh or what is technically called "fat nuts," the trees must be at a distance of at least 20 feet from one another, and well supplied with water.

The supply of nuts fit for use is biennial, but the most abundant supply of commercial oil is obtained from nuts gathered during the rainy season.

Commercial Palm Oil manufacture. — The nut bunches are cut down from the trees and put in a heap outside in the air, where they are allowed to remain for a week or 10 days, which causes the joints of the nuts to be weakened by the process of decomposition, and allows them to be detached by simply beating them against any substance; the nuts are gathered and the husks (decayed sepals) that adhere to their base removed, either by the hand or by rubbing them together, and separated by throwing them in the air and allowing a strong breeze to blow them away. A hole about 4 feet is dug in the earth, which is lined with plantain leaves into which the nuts with the hard unyielding pulp, are put and covered over first with plantain leaves and then with

palm leaves and earth. The nuts are allowed to remain here for various periods, from three weeks to three months, until decomposition of a more or less extent has taken place, so that when removed the pulp is soft and appears as if it had been thoroughly boiled.

They are now put into a trough made by digging a hole 4 feet in depth into the earth, and paving it below and around with rough stones. In some cases a portion of the nuts is boiled in iron or earthenware pots, and then mixed with the unboiled portion, before putting into the trough.

They are now pounded with wooden pestles by several persons standing round the trough until the pulp is quite removed from the surface of the hard nut; the whole is removed from the trough, put into a heap, and the stones taken out, leaving the oily fibrous pulp, which is put into a pot with a small quantity of water under a good fire, and well stirred until the oil begins to melt out. The pulp is then removed and put into a rough net opened at both ends, to which are attached two or three short sticks, by turning which at opposite directions the oil is squeezed out; from the nettings it runs into a receiver or tub leaving the fibre behind. The longer the oil nuts remain underground the thicker the oil will be when made, the quality will also be inferior and the smell bad; cæteris paribus, the shorter time, within certain limits, the nuts are underground, the more superior will be the quality of the oil made from them. This in a great measure will account for the difference in the quality of the oil shipped from different parts of the coast.

Palm Oil for home consumption.—The nut bunches are kept in a hot place for three or four days and the nuts are taken out, a small quantity, from 3 to 4 lbs., is made at a time; they are boiled in iron pots, then put into a wooden mortar and pounded with wooden pestles. The pulpy mass is then mixed with tepid water with the hand, the chaff is first removed and afterwards the stones. The oil remains mixed in the water, which is passed through a sieve to remove the remaining chaff into a pot placed on the fire and heated to boiling point, and allowed to continue in that state whilst the oil floats up as a bright red substance; the water at this stage is being continually stirred and the oil removed as it floats up until the whole is removed. The oil is now put into a pot and heated to drive out any water it may contain.

Second Palm Kernel Oil. — (a.) White; (b.) Brown or Black. The nuts which have been subjected to the process already described in making oil deprived of their external pulp, or old nuts picked up from under the Palm tree, are put in the sun for days and even months until they are perfectly dry; they are then broken between two stones, and the kernels obtained whole or in perfect condition and fit for exportation; this is the commercial Palm kernel. If they have not been perfectly dried the kernels break into pieces.

(a.) *White Kernel Oil.*—The kernels are put into a wooden mortar and pounded very fine, then removed to a grinding stone and ground into a homogeneous mass, which is put into cold water and stirred with the hand: the oil rises in white lumps on the surface of the water, which is collected and boiled; it is of a very light straw colour, and when exposed to the sun and dew becomes after a time perfectly white.

(b.) *Brown or Black Kernel Oil.*—The kernels are put into a pan and fried; the oil oozes out into it from them and it is strained; the

fried nuts are put into a wooden mortar, pounded, and afterwards finely ground on a grinding stone; the mass is thrown into a small quantity of boiling water and stirred continually; the oil rises as a supernatant fluid and is removed until none rises. The pulpy mass is removed from the fire and spread out in a large bowl and allowed to cool, after which it is again ground and put by until the cool of the day, when it is mixed with a little water to soften it. It is now beaten with the hand for some time until the oil comes out in white pellets. As soon as this is observed a large quantity of water is put into it, and the oil in some fatty substance floats on the top, which is skimmed off and boiled and the pure oil obtained.

Under the circumstance detailed above, the exported kernel could not retain its germinative power, besides, I think, like the Cocoa-nut and other plants of the palm tribe for plantation, the nut requires the hard exterior covering for protection in the earth."

I have, &c.
(Signed) S. Freeling,
Governor.

The Right Hon.
The Earl of Carnarvon,
&c. &c. &c.

Colonial Office to Royal Gardens, Kew.

Sir, Downing Street, July 23, 1877.

With reference to the letter to you from this office of the 8th June and to other correspondence, I am directed by the Secretary of State for the Colonies to transmit to you, for your information, a copy of a despatch from the Governor of Labuan, thanking you for the trouble which you have taken in obtaining Palm Oil nuts for that Colony.

I am, &c.
(Signed) Robert G. W. Herbert.

Sir J. Hooker.

Governor Ussher to the Earl of Carnarvon.

Government House, Labuan,
My Lord, June 2, 1877.

I have the honour to acknowledge the receipt of a box of Palm Oil nuts from Dr. Hooker, as notified in your Lordship's despatch, No. 13, of the 31st March, and I have to beg your Lordship to be good enough to thank Dr. Hooker for the trouble he has taken in the matter and for the information he has kindly collected.

2. The nuts will shortly be planted, and I trust will prove successful.

I have, &c.
(Signed) H. J. Ussher,
Governor.

The Right Hon.
The Earl of Carnarvon,
&c. &c. &c.

COLONIAL OFFICE to ROYAL GARDENS, KEW.

Downing Street, October 5, 1877.

SIR,

WITH reference to the letter from this Department of 8th June, I am directed by the Earl of Carnarvon to transmit to you a copy of a despatch from the Governor of Labuan acknowledging the receipt of a report from Governor Freeling upon the methods of extracting the oil from the Oil Palm of West Africa.

(Signed) R. H. MEADE.

Sir J. D. Hooker, K.C.S.I., C.B.

Governor USSHER to the EARL OF CARNARVON.

Government House, Labuan,
July 25, 1877.

MY LORD,

I HAVE the honour to acknowledge the receipt of your Lordship's despatch, No. 29, of the 30th May, transmitting a report from Governor Freeling upon the methods of extracting the oil from the Oil Palm of South Africa.

2. I have the honour to request your Lordship to convey to Mr. Freeling the thanks of this Governm[illegible] the trouble taken by him in the matter.

3. The nuts sent out are in the hands of Mr. Treacher, who will endeavour to form a large plantation on his cousin's property, the fertile island of Daat. Dr. Treacher had already cleared much of the jungle and planted 20,000 cocoa-nut trees, which are bringing in an annual income of nearly 500*l*. If the present parcel of nuts prove a success, as regards their first growth, I purpose, towards the close of the year, requesting that another consignment may be sent to us of about ten "heads" of nuts, to be planted in June or July 1878. This will give about 3,000 trees, and as in some cases fruit is borne by trees of four and five years old, the results of the attempt will be determined within that time.

I have, &c.
(Signed) H. J. USSHER,
Governor.

The Right Hon.
The Earl of Carnarvon,
&c. &c. &c.

Acting-Governor TREACHER to ROYAL GARDENS, KEW.

Government House, Labuan,
August 26, 1878.

SIR,

REFERRING to your letter of the 16th June 1877, I beg to transmit herewith copy of a despatch addressed by me to the Secretary of State for the Colonies, from which you will perceive that from the seeds of the *Elæis guineensis*, kindly supplied to this Government by Sir Joseph Hooker, some 700 trees have sprung up and are in a very healthy condition.

I take this opportunity to request you to convey to Sir Joseph Hooker the thanks of this Government for the trouble he has been good enough to take in this matter.

I have, &c.
(Signed) W. H. TREACHER,
Acting-Governor.

W. T. Thiselton Dyer, Esq.,
&c. &c. &c.
Kew Gardens.

Administrator Treacher to Colonial Office.

Government House, Labuan,
Sir, August 26, 1878.

With reference to the despatches noted in the margin, I have the honour to report that from the seeds of the *Elæis guineensis* sent out to Labuan, at the suggestion of Governor Ussher, by the authorities of Kew Gardens, and which were sown on the Island of Daat, some 700 trees have sprung up.

2. The seeds were planted in August 1877, and notwithstanding a drought, which was quite exceptional and lasted for nearly five months, the young trees flourished, and were transplanted in July last.

3. Mr. Burbidge, a practical botanist travelling here for the firm of Veitch and Sons, Chelsea, and who is ever willing to give others the benefit of his botanical knowledge and experience, saw the trees before and after transplantation, and pronounces them to be in the most healthy condition.

4. As I have already reported, jungle fires prevailed extensively during the drought above alluded to, denuding, or rather completing the denudation of considerable tracts of uncultivated land formerly covered with fine timber trees.

I have, &c.
(Signed) W. H. Treacher,
Administrator.

The Right Hon.
Sir Michael Hicks-Beach, M.P.,
&c. &c. &c.
Colonial Office.

Royal Gardens, Kew, to Colonial Office.

Sir, Royal Gardens, Kew, June 17, 1889.

I am desired by Mr. Thiselton Dyer to inform you that an inquiry was made at Kew respecting an experiment undertaken in the years 1876–78 to establish the African Oil Palm (*Elæis guineensis*) in Labuan.

2. The seeds for the purpose were obtained by Kew at the request of the Colonial Office, and from a copy of a despatch enclosed in your letter of the 18th October 1878, it appears that 700 plants were raised on the island of Daat, most of which were successfully transplanted in July of that year. No information later than 1878 has reached this establishment.

3. In view of the inquiry already mentioned, and for the purpose of completing the records respecting a very interesting experiment, Mr. Thiselton Dyer will be glad if the Secretary of State will approve of a reference being made to the Government of Labuan to obtain a summary of the results attained in this instance.

(Signed) D. Morris.

Sir Robert G. W. Herbert, K.C.B.,
Colonial Office.

COLONIAL OFFICE to ROYAL GARDENS, KEW.

SIR, Downing Street, June 21, 1889.

I AM directed by the Secretary of State for the Colonies to acknowledge the receipt of your letter of the 17th instant, making inquiry as to the cultivation of the African Oil Palm in Labuan, and to inform you that a copy has been transmitted to the Governor for his report.

I am, &c.

The Director of Kew Gardens. (Signed) ROBERT G. W. HERBERT.

COLONIAL OFFICE to ROYAL GARDENS, KEW.

SIR, Downing Street, September 25, 1889.

I AM directed by the Secretary of State for the Colonies to transmit to you, for your information, with reference to the letter from this department of the 21st of June, a copy of the despatch noted in the subjoined schedule on the subject of the African Oil Palm in Labuan.

I am, &c.

The Director of the Royal Gardens, Kew. (Signed) ROBERT G. W, HERBERT.

ACTING-GOVERNOR OF LABUAN to COLONIAL OFFICE.

"Cultivation of the African Oil Palm in Labuan."

As reported in Mr. Treacher's despatch, No. 72 of the 26th August 1878, it appears that 700 of these palms were raised in the island of Daat, and in due time produced nuts. No attempt as far as I am aware was ever made to manufacture any oil from the nuts, and last year the Palms were all removed to make room for Cocoa-nut trees.

Daat, a dependency of this Colony, is private property, and I venture to suggest that should any further information be required by Mr. Thiselton Dyer, that he should apply to the owner, Dr. Peter Leys, who is now in England, and who would no doubt be glad to supply it.

The experiment, so far as I am in a position to judge, was a success.

(Signed) A. S. HAMILTON,

Labuan, 1st August 1889. Acting Governor.

CXXI.—RAMIE or RHEA.

(*Boehmeria nivea*, Hk. & Arn.
Boehmeria nivea, var. *tenacissima*, Gaud.)

Readers of the *Kew Bulletin* will have noticed that considerable attention has been devoted in its pages to the subject of the present note. The previous history of Ramie or Rhea, and of the various efforts that have been made in recent years to render its valuable fibre available for commercial enterprise, have been already fully summarised (*Kew Bulletin*, 1888, pp. 145–149; pp. 273–280; and pp. 297, 298). During the present year interest in Ramie appears to have become more and more general, and judging by the correspondence addressed to this establishment the subject is followed with keen interest at home as well as in India and the Colonies.

In connexion with the Paris *Exposition Universelle*, 1889, a special series of trials was held of machines and processes for decorticating Ramie (Exposition Universelle: Essais spéciaux de machines et appareils pour la décortication de la Ramie), and at the request of the India Office, and in continuation of similar action taken last year, Mr. D. Morris, F.L.S., the Assistant Director, was appointed to represent this country and to prepare a report of the results. This report, with the permission of the Secretary of State for India, is reproduced below:—

Royal Gardens, Kew, October 26, 1889.

A series of interesting trials of machines and processes designed for the decortication of Ramie was held by the French Minister of Agriculture at Paris in 1888, and a report on the subject, which I had the honour to prepare for the information of the Secretary of State for India in Council, was published in the *Kew Bulletin*, 1888, pp. 273–280.

These trials were resumed this year as an integral part of the *Concours spéciaux des instruments agricoles* of the Exposition Universelle, and opened on the 23rd September last. The jury consisted for the most part of the members of the Commission of 1888. The attendance of foreign representatives was considerably larger than in 1888, and the greatest interest was manifested in the proceedings by a large concourse of visitors.

The machines and processes this year were confined to those which had been shown as a regular part of the general exhibition. As will be seen later, all the competitors were French, and this in spite of the fact that more than a dozen machines and processes have lately been designed in this country, which are now in course of being carefully tested.

In my previous report it was pointed out that amongst the French there was attached an importance beyond their value to machines for cleaning Ramie in the dry state. I ventured to express the opinion (p. 278), that as regards India and our own Colonies it was essential that Ramie machines and processes should be competent to deal successfully with the green stems and not the dry; and that until this end was gained Ramie fibre would, I feared, continue to remain unavailable for commercial enterprise. At the recent trials this was all changed. It was a noticeable feature throughout the proceedings this year that no importance whatever was attached to the decortication of dry Ramie stems. The trials were entirely confined to results obtainable with

green stems, and in order to make them still more applicable to field operations some of the stems were supplied freshly cut with leaves and some without leaves.

The following six machines and one process were submitted to the jury :—

1. E. Armand—Paul Barbier, 46, Boulevard Richard-Lenoir, Paris.
2. P. A. Favier—Société la Ramie Française—14, Rue Saint-Fiacre, Paris [for treatment of dry Ramie stems].
3. P. A. Favier—Société la Ramie Française—14, Rue Saint-Fiacre, Paris [for treatment of green Ramie stems].
4. Norbert de Landtsheer, 2, Place des Batignolles, Paris [large machine].
5. Norbert de Landtsheer, 2, Place des Batignolles, Paris [small machine].
6. Félicien Michotte, 43, Rue de Saintonge, Paris.
7. Ch. Crozat de Fleury et A. Moriceau, Villiers-le-Bel, Seine-et-Oise [process for the treatment of green Ramie stems in the field].

Barbier Machine.

The machine of M. E. Armand, constructed by Barbier, and more generally known as the Barbier machine, was in every respect the same as that tried in 1888, and described in my previous report. It is constructed to be worked by hand or by steam power. It weighs 625 kilos., and the price is 48*l*. The construction of the machine is comparatively simple, and consists of a number of cylinders and beaters with a reverse action attached. This latter allows the stalks to be withdrawn when about five-sevenths cleaned, and of the other ends being put in to complete the operation. The disadvantage of this method, as regards time and output of ribbons, is more fully discussed under the De Landtsheer (small) machine. During the trials this machine caused a considerable loss of fibre, carried away with the pith and wood. In the first trials 10 kilos. of green stems without leaves were passed through the machine in six minutes. The result was 1·300 kilos. of wet ribbons of fair quality. This would be at the rate of 130 kilos. of wet ribbons per day of 10 hours; or of 96 pounds (avoir.) of dry ribbons for the same period.

In the second trials 24 kilos. of stems with leaves were put through the machine in 10½ minutes. The result was 1·200 kilos. of wet ribbons of moderate quality. This would be at the rate of 68·500 kilos. of wet ribbons per day of 10 hours; or of 50 pounds (avoir.) of dry ribbons for the same period.

Taking into consideration the cost of this machine and the power necessary to drive it, the out-turn of ribbons is much too small to prove remunerative, and the machine in its present form is useless. Better results than these have been obtained by decorticating Ramie by hand.

Favier Machine.

Two machines were shown by M. P. A. Favier, whose name is well known in connexion with the Ramie industry. Machine No. 1 was designed for the decortication of green Ramie stems, while Machine No. 3 was designed for the treatment of dry stems. In this report the remarks apply only to Machine No. 1. This machine was 2 m. long, 80 cm. broad, and weighed 800 kilos. The price was not stated. It

required three-quarter horse power to drive it, and two persons to feed and receive the ribbons. The machine is adapted to be worked by four persons, but at the trials, owing to want of space, it was worked with only two persons. M. Favier stated that it was designed to produce ribbons entirely free from wood and pith, ready to be converted by a chemical process, also by the same inventor, into the finest filasse ready for weaving. In outward appearance the machine was a long narrow iron box furnished with numerous small cylindrical crushers and beaters. These were entirely covered by a number of moveable iron sheets, which both protected the intricate system of cylinders and prevented the escape of dust and *débris*. The feeding apparatus consisted of a long narrow trough, in which the stems were arranged in lots of four to six and fed to the machine at two apertures leading to the rollers. The first pair of rollers was furnished with fine corrugations to grasp the stems and pass them on to a somewhat complicated system of crushers and beaters. The ribbons passed continuously through the machine, and were ultimately delivered into the hands of a workman at the other end perfectly free from wood and pith. In the first series of trials 10 kilos. of green stems without leaves were passed through the machine in $4\frac{1}{2}$ minutes. Once or twice some of the ribbons were caught in the rollers and the machine had to be stopped. The time occupied in these stoppages was not counted. The wet ribbons yielded by 10 kilos. of stems weighed 2·820 kilos. This would be at the rate of 376 kilos. of wet ribbons per day of 10 hours; or, 276 pounds (avoir.) of dry ribbons for the same period. In the second series stems, more or less with leaves, weighing 60·350 kilos. were passed through the machine in 18 minutes. They yielded 18·100 kilos. of wet ribbons. This would be at the rate of 603 kilos. of wet ribbons per day of 10 hours; or 443 pounds (avoir.) of dry ribbons for the same period.

The ribbons in both cases were well cleaned. There appeared to be no waste. The *débris* under the machine consisted almost entirely of wood and pith.

These results I regard on the whole as satisfactory.

The somewhat intricate character of the various parts of this machine would be against its general use by planters in the Colonies, but there can be but little doubt it is a great advance on most other Ramie machines now available. It might, however, be adapted for use in central factories or *usines* where skilled labour would be obtainable, and for this and similar purposes the Favier machine may be recommended.

Michotte Machine.

The Michotte Machine, called "La Française," at first glance resembled the Barbier and De Landtsheer (small) machines. It was driven by steam-power, and consisted of a pair of large rollers, each furnished with helicoidal grooves running their whole length. The large rollers first crushed the green stems and then passed them on to beaters with moveable bars intended to get rid of the wood and pith. In the first trials, 7 kilos. of green stems were passed through the machine in $1\frac{1}{2}$ minutes, yielding 1 kilo. of badly cleaned ribbons. In the second trial 17·400 kilos. were passed through in $2\frac{1}{2}$ minutes, yielding 6 kilos. of similar ribbons. In both cases the ribbons were mixed with crushed and mangled stems, full of wood and pith. The fibres were also cut transversely (probably by the helicoidal grooves) and rendered useless.

This machine in its present state possesses no merit whatever. It is difficult to realise under what circumstances it could have been entered for trial.

de Landtsheer Machines.

M. de Landtsheer exhibited two machines. The small machine was very similar to that exhibited by him in 1888, but meanwhile it had received some slight modifications intended to accelerate its movements. It was driven by steam-power and required two men to attend to it. It had a horizontal feed plate, and consisted of a series of rollers and beaters which received eight or ten stems at a time. These were cleaned for about five-sevenths of their length, and by a reverse action (operated by a long handle pushed by the workman) they were then withdrawn and the other ends put in and cleaned. It will be noticed that each lot of stems, under this arrangement, had to be presented twice to the machine before they were cleaned. This involved a considerable loss of time and reduced the daily out-turn of ribbons. In the Favier machine, as also in the De Landtsheer large machine, this difficulty has in a great measure been overcome. The De Landtsheer small machine was used for green stems in the second trials only. In these 24·400 kilos. of stems, with leaves, were passed through the machine in 10 minutes. The yield was 6·500 kilos. of wet ribbons of good quality. This would be at the rate of 390 kilos. of wet ribbons per day of 10 hours ; or 286 pounds (avoir.) of dry ribbons for the same period.

In the first trials this machine was used by de Landtsheer to complete the cleaning of ribbons previously passed through the large machine. In this instance 15 kilos. of partially cleaned and wet ribbons were passed through the machine in 6¾ minutes. The yield was 10·500 kilos. of excellent fibre worth, according to the opinion of experts, about 70 to 80 centimes per kilo.

The large machine of M. de Landtsheer, like the Favier machines, had a continuous movement by means of which the stalks passed through the machine, without withdrawal, and the ribbons were delivered at the other end ready for drying. This is an important point gained. Indeed, this was the principal improvement noticed in the machines presented at the Paris trials of 1889, and in all in which it had been adopted there was a marked increase in the out-turn of ribbons. M. de Landtsheer's large machine consists of two pairs of cylinders. The first pair is furnished with grooves opposite one another, while the second have the grooves alternate. Beyond these are two sets of beaters (batteurs à ailettes) which break and get rid of the wood and pith and deliver the ribbons on a revolving stage placed beneath, whence they are quickly picked up by a workman and laid on one side. The particulars of weight and price of this new machine were not obtainable. It was driven by a two-horse power engine and required two men to feed it and remove the ribbons.

In the first trial, 36 kilos. of stems without leaves were passed through the machine in 2½ minutes. They yielded 10 kilos. of wet ribbons, but these ribbons had a considerable quantity of pith and wood lightly adhering to them, and in one instance the amount of wood and pith probably reached 20 to 25 per cent. of the gross weight. Taking the yield of wet ribbons as they left the machine, the 10 kilos. above mentioned would be at the rate of 2,400 kilos. of ribbons per day of 10 hours ; or of 1,763 pounds (avoir.) of dry ribbons for the same period. Even allowing for the presence of pith and wood, which,

when dry, might be removed by a light shaking or scutching, it is evident that this machine will prepare more than half a ton of dry ribbons per day. It is not at all improbable that M. de Landtsheer will be able to effect some further improvement in this machine. In any case the machine is worthy the attention of planters, who with a single instrument could work off about 50 tons of green stems per week. This is an exceptionally good result, and it serves to show what progress has now been made in perfecting machines for treating the Ramie plant on a commercial scale.

In the second trials 46 kilos. of stems with leaves were put through the machine in 11½ minutes. The result was 15 kilos. of wet ribbons (with particles of wood and pith adhering to them as before.) This would be at the rate of 783 kilos. of wet ribbons per day of 10 hours ; or of 575 pounds (avoir.) of dry ribbons in the same period. There is a considerable difference between the results obtained by this machine in the first and second trials. This was also noticeable in the Barbier machine. The construction of these machines evidently does not enable them to cope with stems with leaves attached. On the other hand the Favier machine did better with stems with leaves than those without leaves. This, however, is not a matter of great importance. In the field the leaves could be easily detached during the cutting; and if not removed then, they would fall off of their own accord after lying in a heap (inducing a slight fermentation) for a few hours.

Fleury-Moriceau Process.

Only one process was shown. This was singularly simple, and consisted of steeping the fresh (or dry) stems for a short period in boiling water and removing the ribbons by hand. An open galvanised tank about 6 feet long, 2 feet wide, and about 4 feet deep, filled with water, was raised on bricks (or stones) about 18 inches from the ground over an open fire. When the water had reached boiling point a crate containing 50 to 100 fresh stems was lowered into it (and depending on their age and character) left in it for 5 or 15 minutes. At the end of that time the crate was lifted out, the stems left to drain while another lot was put in. The stems already steeped were then taken up by a couple of workmen and quickly and effectually cleaned by hand. The action of the boiling water had apparently thoroughly loosened the attachment of the cortex to the wood, and ribbons were produced perfectly clean and regular, and apparently without any loss of fibre.

This method was tested in the first trials only. The operation began by placing 18 kilos. of fresh stems in boiling water and allowing them to remain there for 10 minutes. In 36 minutes (or in 46 minutes including the time occupied in immersing the stems) the workmen, apparently not specially trained in the work, produced 5·600 kilos. of excellent ribbons. This would be at the rate of 73 kilos. of wet ribbons per day of 10 hours; or of 161 pounds (avoir.) of dry ribbons for the same period.

This process, it will be noticed, is of the simplest possible description. The only apparatus necessary is a tank. This tank could easily be moved from place to place in the field, and the wood of the stems after the ribbons are removed would probably furnish most of the fuel necessary. The process can, however, only be utilised in a few special countries where labour is very cheap.

M. Crozat states that ribbons produced by this process can be dried, baled, and delivered ready for shipment at a cost not exceeding 8 to 10

centimes per kilo. (about 85 shillings per ton). In Tonkin it could be done for even less than this.

It will be noticed that the Fleury-Moriceau process follows somewhat on similar lines to that of the Favier process of 1882. In this latter the stems were steamed for some time in a close fitting cylinder. The former is, however, much simpler, and requires absolutely no skilled labour, nor any plant except an open tank, large or small, according to the circumstances of the grower.

The inventors of the Fleury-Moriceau process are evidently of opinion that wherever cheap labour is obtainable it is in every way preferable, in the production of Ramie ribbons, to the best machine. After all, placing the Ramie stems in boiling water is only a modification of the old retting process practised so long by the Chinese, and by means of which probably the China grass of commerce is still produced. In any case the Fleury-Moriceau process deserves to be carefully considered, and especially in its applicability to the circumstances of India. There the ryots might grow Ramie in small areas, prepare the ribbons and sell them to merchants for export, or to a neighbouring factory or *usine*. The steaming process of M. Favier, designed for use under similar circumstances, failed no doubt on account of the restrictions placed on the use of the patent, and the uncertainty of the demand for ribbons. The Fleury-Moriceau process re-opens the question under circumstances much more favourable, and the subjeect is one which deserves careful consideration wherever labour is sufficiently abundant to permit of ribbons being produced at a price that will compete with machine-cleaned ribbons.

The relative value of the several machines, and of the Fleury-Moriceau process, tried at Paris in 1889, may be gathered from the following tables:—

TABLE I.—FIRST SERIES of TRIALS. Green stems, without leaves.

Machine.	No. of Hands employed.	Weight of Green Stems. (Kilos.)	Time employed.	Quantity of Wet Ribbons produced. (Kilos.)	Estimated Quantity of *Dry* Ribbons producible in a day of 10 hours (pounds Avoir.).*
Armand-Barbier -	2	10	6 m.	1·300	96
Favier (No. 1) -	2	10	4½ m.	2·820	276
Michotte - -	2	7	1½ m.	1·000	—
De Landtsheer (large machine).	2	36	2½ m.	10·000	1,763†
Fleury-Moriceau process.	2	18	46 m.	5·600	161

* In preparing this estimate the wet ribbons are calculated to yield one-third of their weight of dry ribbons, and the kilo. is taken as equivalent to 2·204 pounds avoir.

† This large yield of ribbons must be reduced about 20 per cent. on account of the pith and wood lightly adhering to them.

TABLE 2.—SECOND SERIES of TRIALS. Green stems, with leaves.

Machine.	No. of Hands employed.	Weight of Green Stems. (Kilos.)	Time employed.	Quantity of Wet Ribbons produced. (Kilos.)	Estimated Quantity of *Dry* Ribbons producible in a day of 10 hours (pounds Avoir.).
Armand-Barbier	2	26	$10\frac{1}{2}$ m.	1·200	50
Favier (No. 1)	2	60·350	18 m.	18·100	443
Michotte	2	17·400	$2\frac{1}{2}$ m.	6·000	—
De Landtsheer:					
(*a.*) Large machine	2	46	$11\frac{1}{2}$ m.	15·000	575
(*b.*) Small machine	1	24·400	10 m.	6·500	287

AWARDS OF THE JURY.

As was the case last year, the official report of the jury will probably not be published till the appearance of the December number of the *Bulletin de l'Agriculture*. In the meantime it may be mentioned that the jury, following the rules applicable to the other exhibits at the Exposition Universelle, awarded a gold medal to M. Favier; a gold medal to M. de Landtsheer; and a silver medal to MM. Fleury-Moriceau. These awards, it will be noticed, follow closely the results already detailed above, and they may be accepted as affording a clear indication of the relative value of the several machines and processes submitted to the jury.

To those generally interested in Ramie culture it may be mentioned that the trials of 1889 have proved much more favourable than those of 1888, and the subject is evidently ripening for solution in many directions not thought of before.

This can be best shown by a comparison of the results as follows:—

TABLE 3.—RESULTS obtained in 1889 compared with those obtained in 1888.

Machine.	Quantity of Dry Ribbons producible in a day of 10 hours (pounds Avoir.) working on Green Stems.	
	1888.	1889.
De Landtsheer:		
Large machine	—	1,763*
Small machine	120	287
Barbier	71	96
Favier, No. 1	—	443
Fleury-Moriceau	—	161

* See note in Table 1.

It will be noticed that the best results obtained in 1888 were at the rate of 120 pounds of dry ribbons per day of 10 hours. This was with the De Landtsheer small machine. In 1889 this machine, with improvements, produced at the rate of 287 pounds of dry ribbons (more than double the quantity) for the same period. With the large machine (make due allowance for the pith and wood lightly adhering to the wet ribbons) the returns of dry ribbons would be at the rate of over half a ton per day.

Other Machines and Processes.

Before closing this report it is desirable to pass under review a few of the machines and processes not represented at Paris which have recently come into notice in this country and elsewhere. In the absence of carefully arranged public trials under the control of men thoroughly conversant with the subject, it must be understood that it is impossible to express an authoritative opinion as to the merits of such machines and processes. They are noticed here solely for the purpose of furnishing a more or less complete record of Ramie experiments which have been undertaken during the present year, and of affording information that otherwise would not be available to persons interested in the subject in India and the Colonies.

The Doty System.

A system brought forward by Captain Doty (inventor of the Doty light) is based on the assumption that no decorticating machine, however meritorious, will fully meet the requirements of Ramie planters, who are obliged, with the aid of unskilled labour, to deal with a large quantity of green Ramie stems within a short time. Captain Doty is of opinion that where labour is cheap women and children might be employed to strip the fibre from the freshly cut stems by hand, and leave 80 per cent. of the weight of the crop (the wood) on the field. Under such circumstances the ribbons alone would be carried away, either to be dried for exportation or to be treated at central factories or *usines*, firstly by a process of fermentation, and subsequently by chemical cleaning and washing to produce filasse ready for spinning.

"Nothwithstanding," says Captain Doty, "the failures of all previous "attempts to deal with this fibre by fermentation it is almost self "evident that a fermentive treatment is the only possible solution of "the problem. No mechanical process that can be devised will ever "eliminate the gum by which the fibres are cemented together, and "without the elimination of the gum the division and sub-division of "the fibres necessary to produce a delicate filasse can never be "obtained."

A trial of the Doty system recently took place near Rome, and a report thereon was prepared by Signor G. Trombetta, Secretary to the Italian Ministry of Agriculture, and published in the *Bolletino di Notizie Commerciale*, Sept. 1st, 1889, pp. 689–690. In this report it is stated that the system is based on the disintegration to which the gummy substance in the Ramie ribbons is exposed by an acid fermentation. The ribbons are first of all tied up in bundles and placed in fermenting vats, where they remain for about a week. They are then taken out and washed. Afterwards they are boiled with certain

chemical ingredients for two hours, washed in cold water, and dried and combed. The report concludes by stating that the fibre was in some cases of unequal character as regards colour and quality, due to the provisional nature of the appliances used; but the results obtained on a small scale gave hopes that with larger quantities and suitable boiling vessels, properly closed, and with proper machinery to agitate the mass, the fibre would be obtained in a more satisfactory condition.

The Till Machine.

As far as can be gathered from a description privately communicated by the inventor (Mr. C. G. Till), this is a large machine, weighing nearly two tons, driven by steam-power, and costing about 150*l*. It is furnished with rollers and beaters, about 3 feet long; it has a continuous action, similar to the Favier and De Landtsheer (large) machine, and takes about 36 stems of green or dry Ramie at a time. It has not yet been fully tested for the out-turn of ribbons, but the inventor estimates that it will clean between half a ton and a ton per day.

Papleux System.

In consequence of letters which appeared in the *Melbourne Argus* at the time of the Centennial Exposition held at Melbourne, inquiries were addressed to Kew respecting the Papleux system for cleaning Ramie.

This system was at one time in operation by Messrs. W. H. Spencer & Co., of Hitchin, Herts, but is now abandoned. Recent experiments have been carried on with a formula invented by Messrs. Spencer themselves, and by means of this they have been successful in preparing small samples of fibre of excellent quality. It is probable that Messrs. W. H. Spencer & Co. will eventually be able to treat Ramie ribbons on a large scale and convert them by mechanical and chemical means into filasse or finished yarns. It is understood, however, that at present the process is not available to the public.

Plaisier Machine.

A machine, the invention of a Dutch engineer named Plaisier, is the subject of an extended notice in *de Indische Mercur* of the 19th January 1889, by Van Gorkhom. This machine, driven by an engine of 1½ horse-power, has been successfully worked at Deli, in Sumatra, for some months, and it is stated to treat 5,000 kilos. of green stems per day, yielding 125 to 150 kilos. of ribbons.

General Remarks.

In the Diplomatic and Consular Reports, Series 1889 (p. 37), there is given an account of an experimental planting of Ramie at a Colony in the Province of Santa Catharina, Brazil. This Colony obtained the first prize for a collection of Ramie fibres at the Antwerp Exhibition.

In the same Reports, No. 525, on the trade of Hankow, attention is drawn to the facilities which exist there for procuring and manipulating Rhea fibre on a large scale. The Consul adds, "it would give me much "pleasure to know that a good business in this article could be started "here. But until machinery for preparing it is perfected, exports "would be premature."

On the 23rd August last a despatch was forwarded by the Foreign Office from the Acting Consul at Carácas, dated the 25th July 1889, giving an accounnt of the formation of an Italo-Venezuelan Company to plant Ramie on a large scale. Experimental plantations had already proved so successful that machinery had been imported to begin the operation of preparing the fibre.

As described in the *Kew Bulletin*, 1888, pp. 145–149, a Ramie factory established in Spain, at Torroella de Montgri, Gerona, in the neighbourhood of large Ramie plantations, appear to have proved successful. This factory employed the Favier decorticating machines. In a letter dated the 19th October 1889, Mr. Wooldridge, Her Britannic Majesty's Consul at Barcelona, informs me that "Ramie is still being "cultivated with important results near Torroella, and that they con- "tinue to use the Favier machines, which are believed to be the most "perfect machines of their kind."

It may be mentioned that these factories are being worked privately, and probably the methods and machinery are not available to the public, except under a special arrangement with M. Favier. The fibre prepared is utilised in France, and does not come into general commerce.

In British tropical possessions, both in the East and West Indies, Ramie is being grown experimentally, in the hope that some machine or process will eventually be produced to enable the fibre to enter into commerce and become a regular article of trade.

The results of the Paris trials last year naturally discouraged Ramie growers, and little if any extension of Ramie planting has taken place since that time. The results of the recent trials will no doubt be closely scanned by those interested in the subject. The first aim of planters should be to produce ribbons of good quality at the lowest possible cost. In other words, planters have to solve the question how to produce Ramie ribbons, that is, to secure the complete removal of the cortex (which contains the fibre) from the green stems, at such a cost as will prove remunerative to themselves and at the same time allow sufficient margin for the cost of converting these ribbons into filasse ready for the spinners. Hitherto the want of success in the production of ribbons has apparently been the only obstacle to the development of a Ramie industry. And probably on this account the Paris trials were wholly devoted to the production of ribbons and not of filasse. The conversion of ribbons into filasse is a subject believed to be more easily dealt with. In fact there are several systems exclusively devoted to this department which appear to accomplish it. Some machines, it is true, have attempted to produce filasse by a single process from the green stems. The result has not been satisfactory, and it is very unlikely that this can be done with a plant like Ramie, in which the individual fibres are so completely immersed in gummy matter. Hence the subject has been divided into two parts. The first is concerned alone in the removal of the fibre in the form of ribbons from the green stems, either in the fields or in their immediate neighbourhood. The second is devoted to the treatment of these ribbons and in their conversion by chemical and other processes into filasse, or fine white silky fibres ready for the spinner. The first process will naturally take place where the plants are grown, in the Colonies or elsewhere, and machines like those of Favier and De Landtsheer, or processes like that of Fleury-Moriceau, may be adopted according to the special circumstances of the planter. Sufficient progress has now been made in the working of these machines and processes to justify careful trials being undertaken with them both in India and the Colonies. If these machines

or any others that may be forthcoming prove entirely satisfactory, and ribbons can be produced at a low initial cost, the question of their conversion into filasse is one which will naturally come into prominence. The conversion of ribbons into filasse will very probably, at first at least, take place in Europe, where chemicals and skilled labour are the more readily available. In some countries it may be found advisable later on to establish central factories or *usines* on the spot (to save freight charges on the ribbons), and ship only the filasse to Europe. In any case once a Ramie industry is well started, there can be no doubt numerous countries will seek a share in it, and only those possessing special advantages for the growth of the plant, a supply of cheap labour, and good facilities for transport and shipment can hope to make it a success.

The best market for Ramie at present appears to be France. What little is imported into this country, in the form of China grass or Rhea, is bought up for the French market. In the Monthly Circular of Messrs. Ide and Christie for the 15th October 1889, China grass is quoted "quiet" at 31*s.* to 35*s.* per cwt.; and Rhea, "no business," at 14*s.* to 10*s.* per cwt.

With regard to what is known in commerce as "China grass," this is hand-cleaned fibre shipped usually from Chinese ports. It arrives in this country in small parcels, the yearly importation being only about 100 tons. It is nearly all taken up by continental buyers. Rhea is the term applied to machine-cleaned fibre, generally in the form of ribbons or half-cleaned stuff. The price is much less than China grass, and in case of large shipments would probably not exceed about 7*l.* or 8*l.* per ton. It is important therefore for Ramie planters to aim at the production of ribbons at a cost not exceeding about 4*l.* or 5*l.* at the port of shipment. Important elements in such production would be to plant Ramie only in places where the soil and climate will allow of three or four crops to be reaped per annum; where labour is very cheap and abundant, and where good facilities exist for transport and shipment.

D. Morris.